Sealing disc and film composite for a closure of a container

The invention relates to a sealing disc and a film composite for a container closure, for use on a container with an opening bounded by a peripheral edge, wherein the film composite consists of a plurality of layers, and between the upper layer and the layer lying beneath it there is arranged an adhesive layer at least over a joining surface.

On the closure of a container it is frequently desirable, or even necessary, to provide the container mouth with a disc-shaped closure which seals off the contents, for example liquids or else substances such as foodstuffs.

There are several reasons why said sealing off is required. On the one hand, the contents are to be protected against outside influences, for example against water vapour or oxygen, on the other they are also to remain aroma-tight. There is a further reason in the case of aggressive contents, for which as optimum a leakage protection as possible must be provided. Finally, an originality protection for the trade may also be provided by such a sealing off, since a user is able to recognise immediately whether someone has already handled the container contents beforehand.

In addition, the container closure is then also sealed with a screw cap or a similar element, which ensures a mechanical and stable sealing outside the film. On initial use the user destroys the film in order to obtain access to the contents of the container and closes the container afterwards (unless he has already removed the entire contents) with the screw closure, which may provide a temporary seal for the opened contents for a suitably short period of time.

The film that seals the container contents is frequently applied by means of induction sealing. A complete sealing disc is put on for this purpose, whose bottom-most layer forms the sealing layer. Above it lies a second layer consisting as a rule of aluminium, which serves for the generation and transmission of heat during the induction process and

optionally forms an additional mechanical protection. The second layer is connected to the first one firmly and in particular favourably for the transmission of heat. Above said aluminium layer are then provided also further components of the sealing disc, which remain in the cap after the opening of the screw or other rotating closure.

The removal of the film is irksome for the user in certain circumstances. He requires a tool for this, for example a knife or a pair of scissors, which leads to the risk that parts of the film will thereby fall into the container contents. In addition, a suitable tool is not always to hand. There are also already screw closures whose outside is so formed that when used the other way round they permit a partial cutting or tearing of the film here. This makes the screw cap more expensive and it is also necessary to give the user suitable instructions on the method, so that he may carry out the opening correctly.

It has also already been proposed as an alternative, for example in EP 0 697 345 A2, that the sealing disc, or at least the film composite, be provided at its edge with suitable projections or tabs, which the user may grasp, thus allowing him, supported in this way, to easily remove the sealed-on film. Said extremely practicable construction may not be used in every case, however, since said projecting tabs must after the positioning of the screw cap be able to be arranged between the screw thread and the outside of the container opening, a fact which may lead to geometrical difficulties. It is also problematical if, for example, the upper parts of the sealing disc must not exhibit any lugs, because this prevents their retention in the screw cap part. Two separate punching operations would then have to be provided for the film composite and the upper parts of the sealing disc, which leads to further costs.

It has therefore been proposed in EP 0 395 660 B1 and EP 0 534 949 B1 that the sealed-on film composite be constructed of two layers that are bonded to one another over roughly half of their area, while the other half remains free. This results in the half of the upper layer that is not bonded being able to be detached easily, whereas the other area remains connected during said detachment. If such a two-layered, partially bonded film composite is used on the container, the user simply has to grasp said admittedly flatly

positioned but easily detachable half of the upper layer and is then able to remove the whole of the film composite by exerting a suitable force.

This rather striking idea nevertheless has some drawbacks. A mass market product is naturally involved, in which cost considerations play a very great role. A process must therefore be found in which two layers may be connected to one another in such a way that they are only partially bonded. This can be brought about by a relatively laborious strip-wise lamination.

A further drawback consists in the fact that because of the partially open upper layer, problems arise during the filling and closing of the containers. If the screw closure is applied with rotation, the latter has a tendency to attack the film by friction. As the upper layer is supported loosely in part, it is on some occasions also pulled slightly here, which may lead immediately to uncontrolled creasing and also to buckling and to destruction. In the container filling industry, however, even minimal wastage rates are extremely undesirable, since as a rule the whole container then has to be rejected or may lead to complaints.

The object of the invention is therefore to propose a sealing disc and a sealing film for a container closure which also leads to an easy opening of the film for the user, but at the same time is also convenient and reliable in manufacture and does not require additional punching operations.

Said object is achieved in the case of a film composite by the fact that the upper-most of the layers of the film composite comprises an upwardly projecting fold.

There may be exploited first of all with such a fold all the advantages that are also exhibited by ideas, for example, from EP 0 395 660 B1 or EP 0 534 494 B1. It is not necessary to cut open the film composite or to provide tabs projecting over the edge. In the case of a positioned screw cap, the fold naturally lies flat on the top side of the

remaining film composite. It is not bonded with the latter, however, since the outside of the upper layer is here supported on another area of the outside of the upper layer.

The user now simply grasps said fold, raises it and then removes the entire film composite with it. In so doing he will as a rule grip one end of the fold and be able at said point to pull the film easily upward vertically, whereby a "rolling away" of the remaining edge is then obtained.

Conversely, the drawbacks from the aforementioned prior art are advantageously not encountered. The outer edge of the film composite consists, in fact, of the same, identical formation the whole way round: both the upper and the lower layers are everywhere present. There is therefore no tendency to buckling or creasing.

The flatly positioned fold represents, in contrast to the prior art, additional material and is therefore relatively insensitive. Without additional punching operation it does not project, even in the flat lying state, completely up to the edge side, but ends before the latter.

Particularly preferably the fold is so arranged that it lies off-centre. As a result, it will have a tendency to tilt in one direction, without its raising being affected disadvantageously in any way.

In order to simplify the gripping area and the tearing open, the fold should however remain relatively adjacent to the centre, so that a division of the overall surface is preferred such that the smaller area occupies a zone of 40 to below 50% of the total area.

It has proved to be particularly practical for the grasping if the fold exhibits a spacing of between 0.5 and 2 cm, in particular between 1 and 1.5 cm, between the fold bottom directly on the sealing film and the fold tip.

It is also preferable if the adhesive layer is provided at any rate in the area of the upper layer that forms the fold. In this way there will be formed in said zone a contacting of

adhesive layer to adhesive layer within the fold, which increases and improves the stability and firm bonding of the latter enormously, which has a corresponding effect on the tearing and tensile strength and also prevents the fold bulging or swelling in a roughly oval shape due to external effects.

It is particularly preferable, finally, if the adhesive layer occupies the whole area of the upper layer. This is of advantage in production engineering terms; the stripwise lamination known from the prior art, with partial provision and partial omission of an adhesive layer, is especially complicated, in fact, and the full area bonding furthermore also improves the stability and the adhesion of the entire film composite.

Further it is advantageous if the whole area of the sealing film is slightly greater than the opening to be covered, including the peripheral edge.

This very slightly projecting amount of material makes it easier to pull the edge upwards when grasping the fold. A quite small edge area is created, in fact, which is not be grasped from behind, but which during the raising of the fold is on the peripheral edge of the opening of the container without direct adhesion, and thus favourably influences the tearing process. Said projecting edge is on the other hand of such small proportions that it is significantly smaller than, say, the tabs from EP 0 697 345 A2 and in no circumstances comes into contact with the screw cap.

The object is achieved in the case of a sealing disc by the fact that the lower layers of the sealing disc comprise the film composite according to one of the above combinations of features.

Such a sealing disc possesses all the above-mentioned advantages. It is perfectly possible to incorporate the layer forming the fold, together with said fold, straightaway in the production of the sealing disc, and then to use the complete component in this way in the packaging industry.

An embodiment of the invention will be described in detail below with reference to the drawing, in which:

Figure 1 shows a diagrammatic perspective view of a container with a first form of execution of the sealing film,

Figure 2 a diagrammatic section through the sealing film from Figure 1 and

Figure 3 a diagrammatic section through a sealing disc with a sealing film of corresponding form of execution from Figure 2.

A container 10 is filled, for example, with foodstuffs or agrochemicals or other oxygen-sensitive goods, in particular with liquid. It possesses an opening 11 from which the contents are to be removed at a given time. The opening 11 is surrounded by a peripheral edge 12.

The opening 11 is sealed by a film composite 30. Above the film composite 30 is also located a screw cap (not shown), with which, even if the film composite 30 is destroyed, the container may be sealed at least temporarily. The screw cap also serves to protect the film composite 30 against mechanical influences from outside.

The film composite 30 possesses in particular three film layers and two adhesive layers. This is clearly distinguishable in Figure 2. The bottom-most layer 34 is in the sealed-on state fixed exactly on the peripheral edge 12 of the container 10. On the first or bottom-most layer 34 is arranged an adhesive layer 35, which connects said first layer 34 firmly to a second layer 31. The second layer 31 is an induction film, in particular of aluminium. If it is heated by induction, said heat is transferred to the bottom-most layer 34 and thus seals the latter firmly on the edge 12.

On said second layer 31, the induction film, is provided a further adhesive layer 32. The second adhesive layer 32 connects said layer 31 to upper-most layer 33 continuously.

The layer 33 comprises a fold 40. The layer 33 is planar outside the area of the fold 40 and connected to the underlying layer 31 continuously by the adhesive layer 32. In the area of the fold 40 the whole of the layer 33 is laid double starting from the fold bottom 41 and extends like this up to the fold tip 42 and from there back again to the fold bottom 41. Between said two doubly laid material components of the upper layer 33 is also located the adhesive layer 32, and preferably likewise two-fold. This can be brought about at the manufacturing stage by the upper layer 33 being coated with the adhesive layer 32 over its whole surface while still in the unfolded state, and then during the line manufacture being bent onto the layer 31 of the induction film with the addition of said fold. The fold 40 is thus particularly stable and because of the dual adhesion also bonded particularly firmly into itself. It may nevertheless have a light and filigree effect, for example because of the fact that the whole of the layer 33 is made of a transparent material.

The fold 40 extends diagonally across the film at right angles to the drawing plane. The distance between fold bottom 41 and fold tip 42 is constant here, optionally with bevels or curves in the edge area. The fold tip therefore forms a substantially straight line.

The effect that the whole of this has can be seen in Figure 1. The whole of the container mouth or opening 11 of the container 10, which mouth or opening 11 is covered by the film composite 30, is at the same time provided just off-centre with the fold 40, which rises upward from the fold bottom 41 lying exactly in the plane of the opening 11 of the container 10. The fold 40 is shown slightly inclined, the reason for which is that it lies completely flat in the packed state, occupies little space in this way, and also offers no opportunity for gripping by the screw cap during the screwing on.

Figure 3 shows diagrammatically a complete sealing disc 20, of which the film composite 30 with its three film and two adhesive layers 31, 32, 33, 34 and 35 together with fold 40 forms the bottom-most part.

The upper portion may be a polyamide layer or another polymer.

Use is possible for all containers, glass, PET, PAC, PP, PVC. The sealing layer beneath the induction film layer 31 consisting of aluminium [is] adapted to any material of the container.

The end consumer is provided with an outstanding quality, a construction that can be opened easily by means of the projecting fold, which also opens reliably and does not tear.

The filler or packaging manufacturer is presented with the advantage that such a sealing film or such a sealing disc may be used particularly reliably without problems during the charging operation having to be anticipated.

The manufacturer of the sealing film is presented with the advantage that he longer has to carry out strip lamination, but is concerned exclusively with materials covering a whole area.

The fold 40 is not formed until the punching stage. A suitable tool of a punching tool is set so that the whole-area material arrives suitably folded.

List of reference symbols

10	container
11	opening
12	edge of the opening
20	sealing disc
30	film composite
31	second layer, induction film layer
32	second adhesive layer
33	upper-most layer
34	bottom-most layer, sealing layer
35	first adhesive layer
40	fold
41	fold bottom
42	fold tip